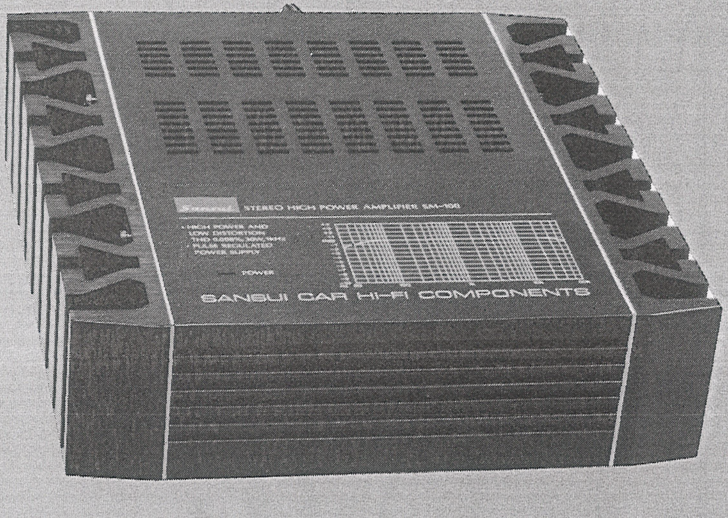
SERVICE MANUAL

CAR HI-FI EQUIPMENT
STEREO POWER AMPLIFIER

SANSUI SM-100


STEREO HIGH POWER AMPLIFIER SM-100
POWER
SANSUI CAR HI-FI COMPONENTS

Sansui

SANSUI ELECTRIC CO., LTD.

•SPECIFICATIONS

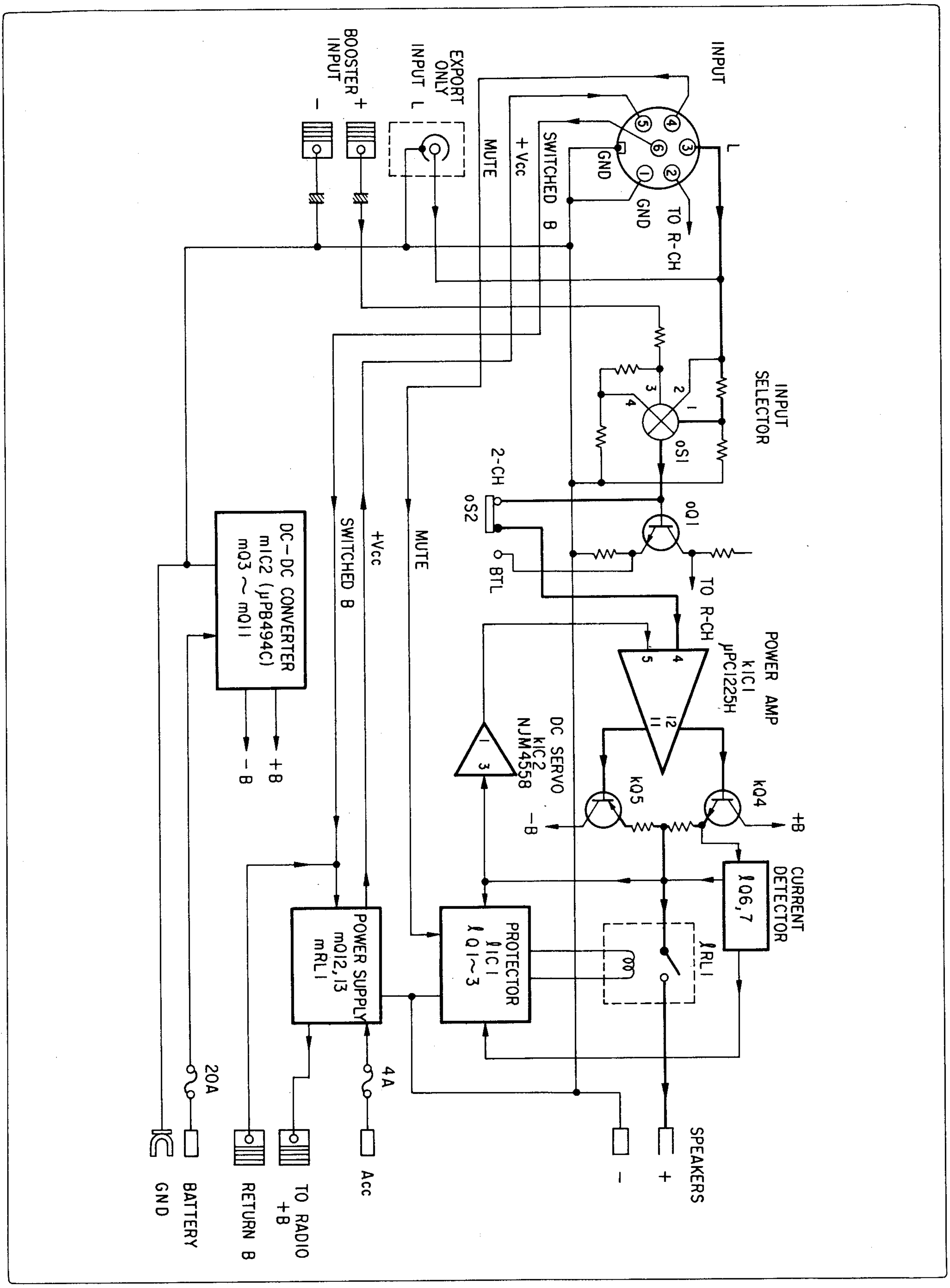
Power output
Both channels driven, from 20 to 20,000 Hz, with no more than 1.0% total harmonic distortion
32 watts per channel into 4 ohms

Maximum output power
(1kHz, 10% total harmonic distortion)

Stereo operation	55 watts per channel into 4 ohms
Monaural (BTL) operation	100 watts per channel into 4 ohms
Load impedance	4 ohms
Input sensitivity and impedance (1 kHz)	
LINE (LOW)	0.1V/10 kilohms
LINE (HIGH)	0.5V/10 kilohms
BOOSTER (LOW)	0.5V/3 kilohms
BOOSTER (HIGH)	2V/3 kilohms
Signal to noise ratio (A network)	90 dB
Frequency response	20 Hz to 50 kHz +0 dB, −3 dB
Power requirements	DC 12.0V (Usable: 10,8～15.6V) Rated: 14.4V negative ground
Current consumption	15A (18A: BTL operation) Maximum
Dimensions	200 mm (7-7/8″)W 55 mm (2-3/16″)H 217 mm (8-9/16″)D
Weight	2.8 kg (6.2 lbs) net

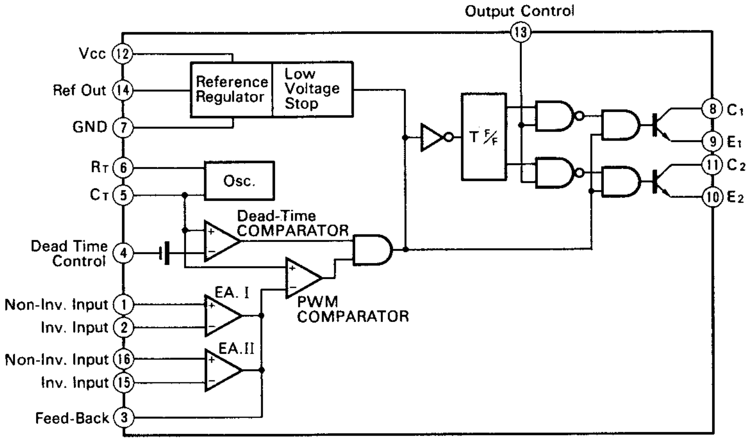
* **Design and specifications subject to changes without notice for improvements.**

1. BLOCK DIAGRAM

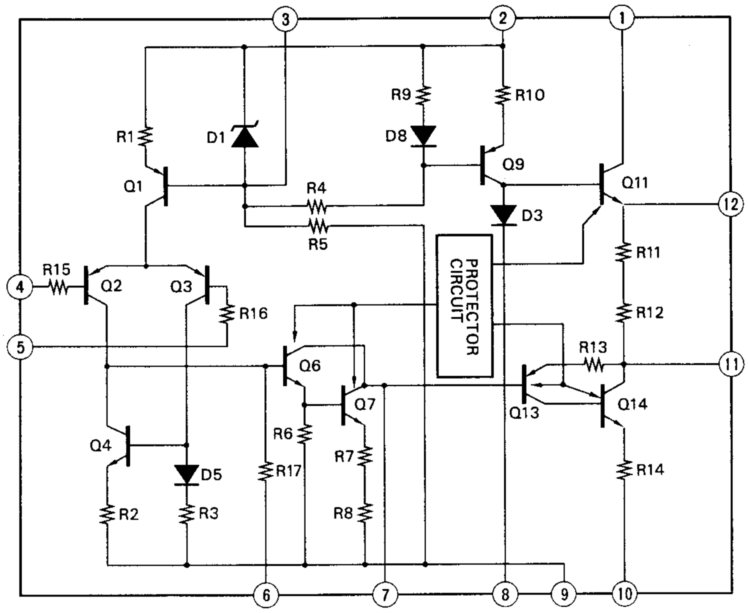

INPUT
L
⑤
④
③
⑥
②
①
GND
GND
TO R-CH
EXPORT ONLY INPUT L
BOOSTER INPUT
+
–
SWITCHED B
+Vcc
MUTE
INPUT SELECTOR
1
2
3
4
oS1
2-CH
oS2
BTL
oQ1
TO R-CH
POWER AMP
kIC1
μPC1225H
4
5
12
11
DC SERVO
kIC2
NJM4558
1
3
kQ4
kQ5
+B
–B
CURRENT DETECTOR
ℓQ6,7
ℓRL1
DC–DC CONVERTER
mIC2 (μPB494C)
mQ3 ~ mQ11
+B
–B
SWITCHED B
+Vcc
MUTE
PROTECTOR
ℓIC1
ℓQ1~3
POWER SUPPLY
mQ12,13
mRL1
20A
4A
SPEAKERS
+
–
Acc
TO RADIO +B
RETURN B
BATTERY
GND

2. INTERIOR BLOCK DIAGRAM OF IC

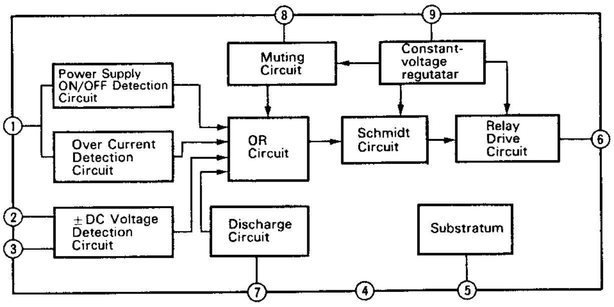
•μPC494C (Switching Regulator Control IC)


Output Control
13
Vcc 12
Ref Out 14
GND 7
RT 6
CT 5
Dead Time Control 4
Non-Inv. Input 1
Inv. Input 2
Non-Inv. Input 16
Inv. Input 15
Feed-Back 3
Reference Regulator
Low Voltage Stop
Osc.
Dead-Time COMPARATOR
PWM COMPARATOR
EA. I
EA. II
T F/F
8 C1
9 E1
11 C2
10 E2

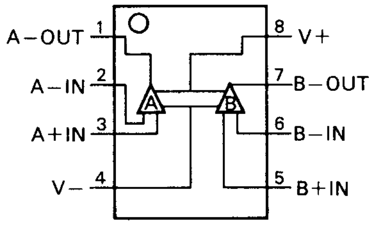
•μPC1225H (Driver Amp. IC)


1
2
3
4
5
6
7
8
9
10
11
12
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
D1
D3
D5
D8
Q1
Q2
Q3
Q4
Q6
Q7
Q9
Q11
Q13
Q14
PROTECTOR CIRCUIT

•TA7317P (Protector IC)


1
2
3
4
5
6
7
8
9
Power Supply ON/OFF Detection Circuit
Over Current Detection Circuit
±DC Voltage Detection Circuit
Muting Circuit
Constant-voltage regutatar
OR Circuit
Schmidt Circuit
Relay Drive Circuit
Discharge Circuit
Substratum

•NJM4558D (OP Amp. IC)

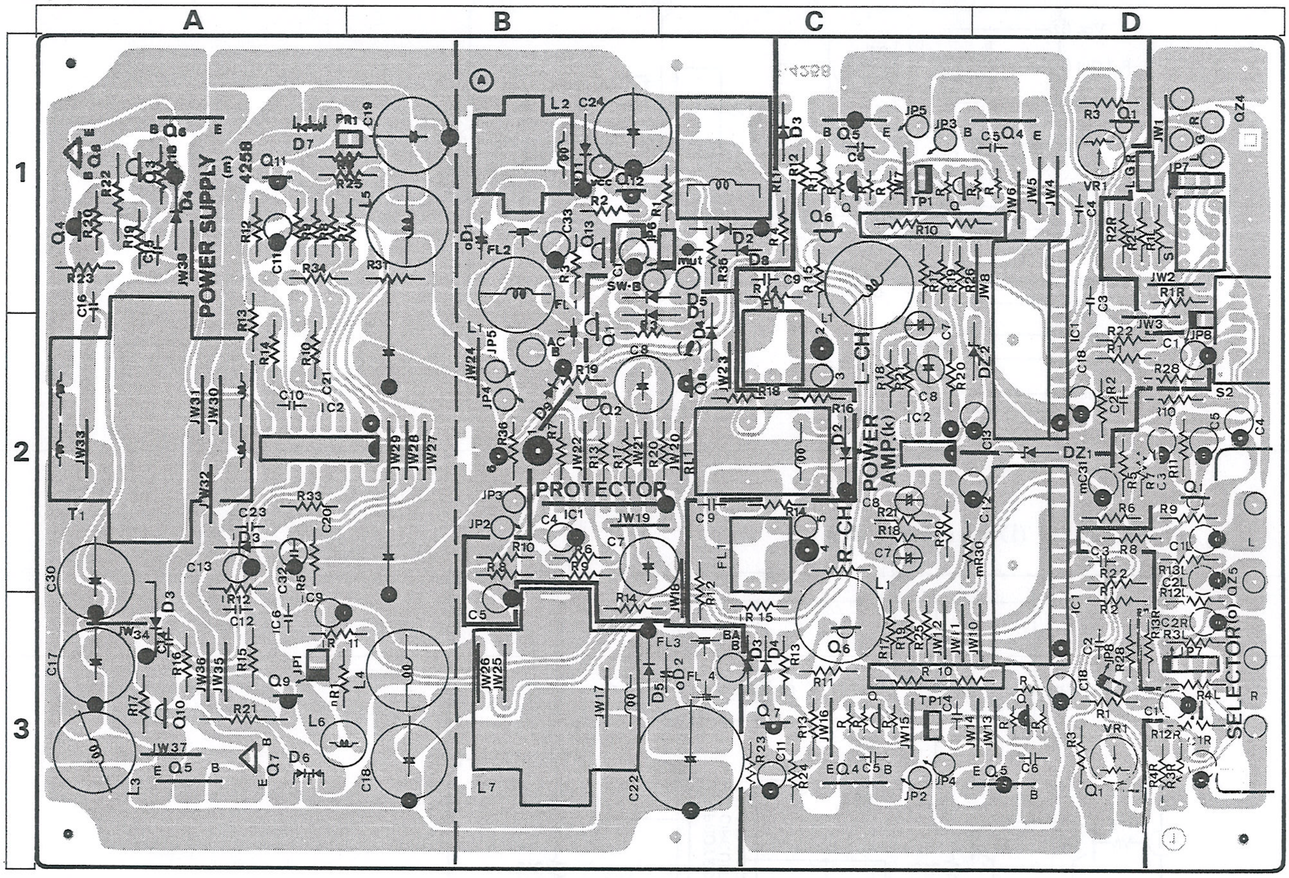

A-OUT 1
A-IN 2
A+IN 3
V- 4
8 V+
7 B-OUT
6 B-IN
5 B+IN
A
B

3. PARTS LOCATION & PARTS LIST

• Since some of capacitors and resistors are omitted from parts lists in this service manual, refer to the Common Parts List for capacitors & resistors, which was issued on Feburary 1983.

3-1. F-4258 Power Amp. & Power Supply Circuit Board (Stock No. 00750301)

Component Side



Parts List

Parts No.	Stock No.	Description
•Transistor		
kQ1	03059501	2SC945
	or 07194801	2SC1815
kQ4	03068701	2SC2577
kQ5	03011801	2SA1102
kQ6	46367301	2SC2458
	or 46391901	2SC2785
kQ7	46367201	2SA1048
	or 46392001	2SA1175
•IC		
kIC1	46446000	μPC1225H
kIC2	03607700	NJM4558D
•Diode		
kD3	03117600	1S2473T77
kD4	03117600	1S2473T77
•Zener Diode		
kDZ1	03179000	RD13E-B
kDZ2	03179000	RD13E-B
kR10	00091700	0.33Ω×2 5W Ce.R.
kC7	08451400	4.7μF 25V E.B.
kC8	08451400	4.7μF 25V E.B.
kFL1	46612800	Common Filter
kL1	46027200	1μH Inductor
kVR1	46634000	3.3kΩ S.V.R., Bias Adj.

Parts No.	Stock No.	Description
•Transistor		
lQ1	46367301	2SC2458
	or 46391901	2SC2785
lQ2	46367301	2SC2458
	or 46391901	2SC2785
•IC		
lIC2	46207600	TA7317P
•Diode		
lD1	03117600	1S2473T77
lD2	03117700	10E-2
lD3	03117600	1S2473T77
lC7	46534900	220μF 6.3V E.C.
lC8	46534900	220μF 6.3V E.C.
lRL1	46533600	Protector Relay
•Transistor		
mQ3	46614101	2SC3243
mQ4	46614001	2SA1283
mQ5	46636201	2SC3300
	or 46535201	2SC2750
mQ6	46636201	2SC3300
	or 46535201	2SC2750
mQ7	03069301	2SC2238
mQ8	03069301	2SC2238
mQ9	46614001	2SA1283
mQ10	46614101	2SC3243
mQ11	46581601	2SA992
mQ12	46614001	2SA1283
mQ13	46367301	2SC2458
	or 46391901	2SC2785

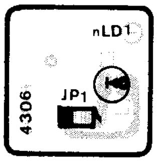
Parts List <F-4258>

Parts No.	Stock No.	Description
•IC		
mIC2	46534100	μPC494C
•Diode		
mD1	03117700	10E-2
mD2	03117700	10E-2
mD3	07112300	10DF2
mD4	07112300	10DF2
mD5	03117700	10E-2
mD6	46534000	CTU21S
mD7	46533900	CTU21R
mD8	03117700	10E-2
mOD1	46271300	ENB220D-10B Varistor
mOD2	46271300	ENB220D-10B Varistor
mPR1	46535400	PTH487A01BH471TS Posistor
mR21	46624300	100Ω 2W N.I.R.
mR22	46624300	100Ω 2W N.I.R.
mC17	46604700	1000μF 16V E.C.
mC18	46637500	220μF 35V E.C.
mC19	46637500	220μF 35V E.C.
mC20	46533800	3300μF 35V E.C.
mC21	46533800	3300μF 35V E.C.
mC30	46604700	1000μF 16V E.C.
mFL1	46271100	Filter Capacitor
mFL2	46271100	Filter Capacitor
mFL3	46271100	Filter Capacitor
mFL4	46271100	Filter Capacitor
mL1	46273800	50μH Choke Coil
mL2	46533300	3mH Choke Coil
mL3	46534200	10μH Choke Coil
mL4	46534300	15μH Choke Coil
mL5	46534300	15μH Choke Coil
mL6	46090000	1mH Choke Coil
mL7	46636000	Choke Coil
mT1	46533400	Transformer,DC-DC Converter
mRL1	46533700	Power Relay
•Transistor		
oQ1	46367301	2SC2458
	or 46391901	2SC2785
oS1	46636300	Rotaly SW., INPUT SELECTOR
oS2	46177200	Slide SW., BTL
	46438100	2P Input Terminal Board, LINE IN
	46637400	4P Push Terminal, BOOSTER INPUT

• The following circuit boards are not supplied as the assembled. However, the individual parts on the circuit boards are provided for orders.

3-2. F-4306 POWER Indicator LED Board

Component Side

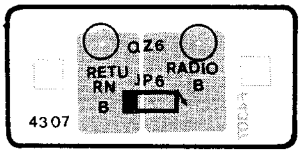


Parts List

Parts No.	Stock No.	Description
nLD1	46176900	Light Emitting Diode TLS-123

3-3. F-4307 Push Terminal Board

Component Side



Parts List

Parts No.	Stock No.	Description
•Transistor		
lQ3	46367201	2SA1048
	or 46392001	2SA1175
•Diode		
lD4	03117600	1S2473T77
	46636100	2P Push Terminal, RADIO B/RETURN B

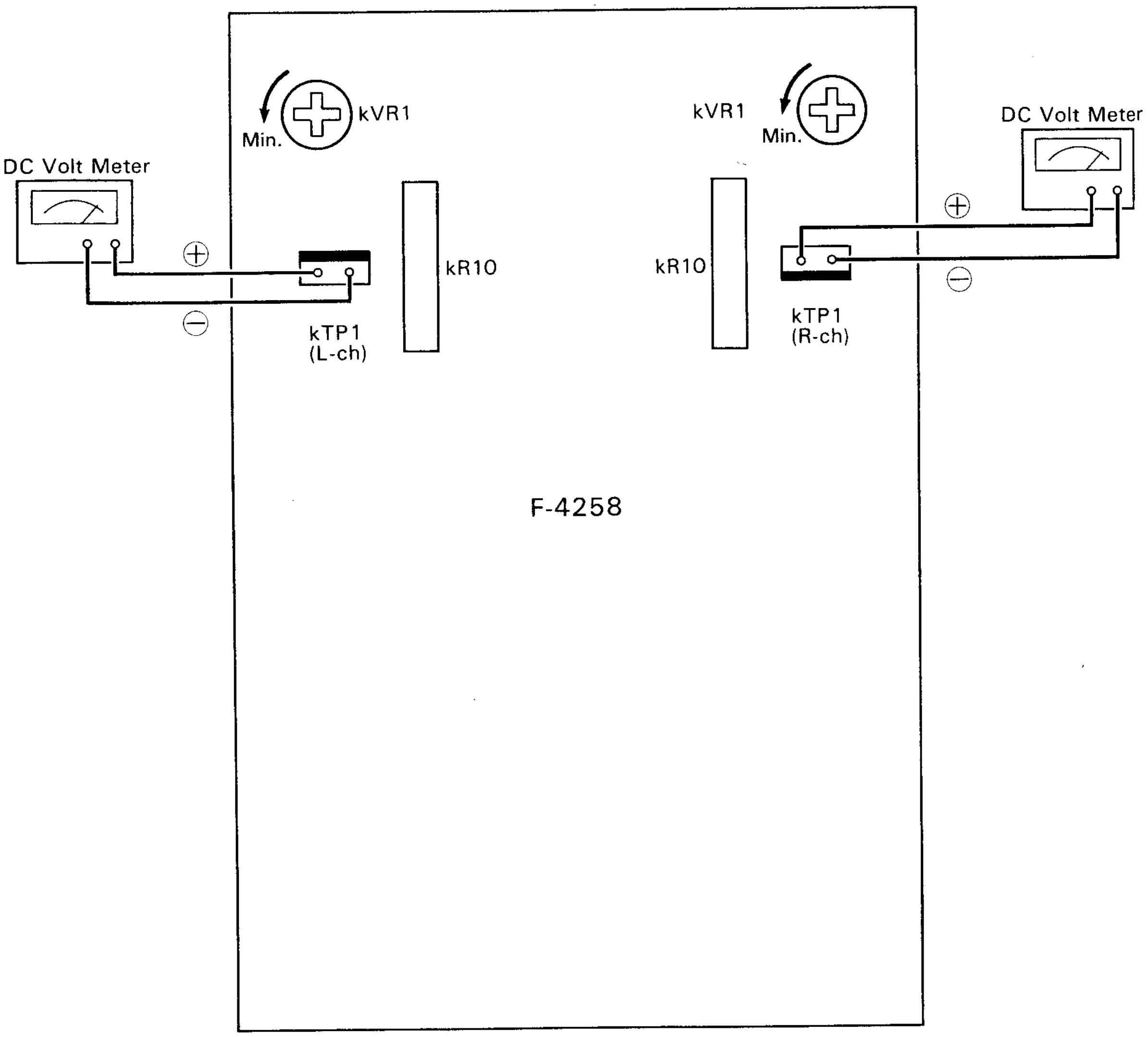
•Abbreviations

C.R. : Carbon Resistor
S.R. : Solid Resistor
Ce.R. : Cement Resistor
M.R. : Metal Film Resistor
F.R. : Fusing Resistor
N.I.R. : Non-Inflammable Resistor
C.C. : Ceramic Capacitor
C.T. : Ceramic Capacitor, Temperature Compensation
E.C. : Electrolytic Capacitor
E.L. : Low Leak Electrolytic Capacitor
E.B. : Bi-Polar Electrolytic Capacitor
E.B.L. : Low Leak Bi-Polar Electrolytic Capacitor
Ta.C. : Tantalum Capacitor
F.C. : Film Capacitor
M.P. : Metalized Paper Capacitor
P.C. : Polystyrene Capacitor
G.C. : Gimmic Capacitor
V.R. : Variable Resistor
S.V.R. : Semi Variable Resistor
SW. : Switch

4. ADJUSTMENT

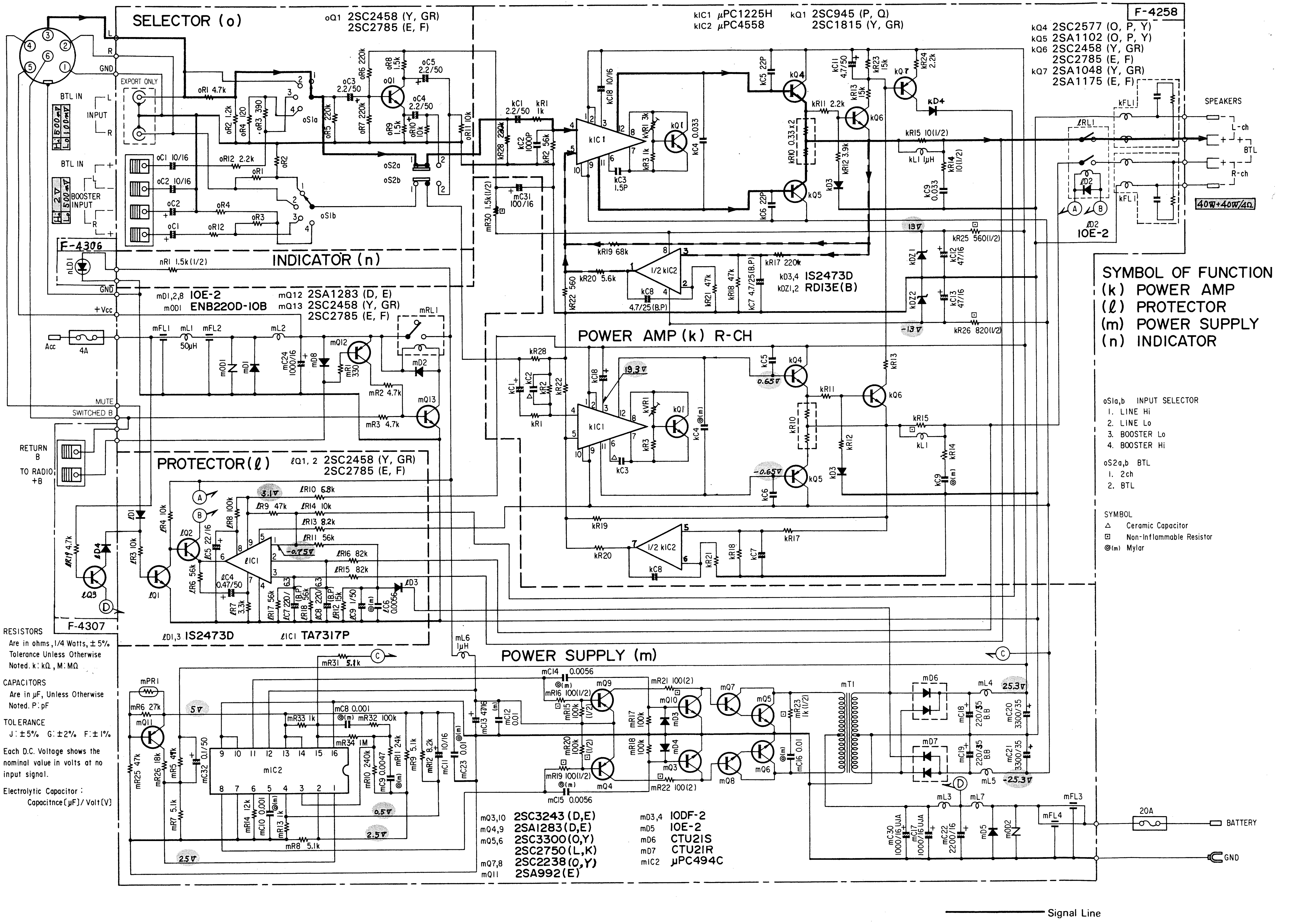
Note: 1) Room Temperature ...... 18°C ~ 28°C
2) For adjustment, run the unit for more than 3 minutes after the power is switched on.
3) Before turning ON POWER switch, turn kVR1 on F-4258 fully counterclockwise.

STEP	SUBJECT	MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
1.	L-CH Bias Current Adj.	kTP1, (L-CH) F-4258	kVR1, (L-CH) F-4258	DC 10mV	This bias current adjustment converts current value into voltage by ohms law.
2.	R-CH Bias Current Adj.	kTP1, (R-CH) F-4258	kVR1, (R-CH) F-4258	DC 10mV	


kVR1
Min.
kVR1
Min.
DC Volt Meter
DC Volt Meter
⊕
⊖
⊕
⊖
kR10
kR10
kTP1
(L-ch)
kTP1
(R-ch)
F-4258

5. SCHEMATIC DIAGRAM

*Design and specifications subject to change without notice for improvement.
*La présention et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
*Anderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.


SELECTOR (o)
oQ1 2SC2458 (Y, GR)
2SC2785 (E, F)
kIC1 μPC1225H
kIC2 μPC4558
kQ1 2SC945 (P, Q)
2SC1815 (Y, GR)
F-4258
kQ4 2SC2577 (O, P, Y)
kQ5 2SA1102 (O, P, Y)
kQ6 2SC2458 (Y, GR)
2SC2785 (E, F)
kQ7 2SA1048 (Y, GR)
2SA1175 (E, F)
SPEAKERS
L-ch
BTL
R-ch
40W+40W/4Ω
ℓD2 1OE-2
EXPORT ONLY
BTL IN
INPUT
BOOSTER INPUT
L
R
GND
F-4306
INDICATOR (n)
nR1 1.5k(1/2)
nLD1
mD1,2,8 1OE-2
mOD1 ENB220D-10B
mQ12 2SA1283 (D, E)
mQ13 2SC2458 (Y, GR)
2SC2785 (E, F)
+Vcc
Acc
4A
MUTE
SWITCHED B
RETURN B
TO RADIO +B
POWER AMP (k) R-CH
kD3,4 1S2473D
kDZ1,2 RD13E(B)
13V
-13V
19.3V
0.65V
-0.65V
PROTECTOR (ℓ)
ℓQ1, 2 2SC2458 (Y, GR)
2SC2785 (E, F)
3.1V
-0.75V
F-4307
ℓD1,3 1S2473D
ℓIC1 TA7317P
POWER SUPPLY (m)
5V
0.5V
2.5V
25.3V
-25.3V
mIC2
mT1
20A
BATTERY
GND
mQ3,10 2SC3243 (D,E)
mQ4,9 2SA1283 (D,E)
mQ5,6 2SC3300 (O,Y)
mQ7,8 2SC2750 (L,K)
2SC2238 (O,Y)
mQ11 2SA992 (E)
mD3,4 1ODF-2
mD5 1OE-2
mD6 CTU21S
mD7 CTU21R
mIC2 μPC494C
Signal Line

RESISTORS
Are in ohms, 1/4 Watts, ± 5%
Tolerance Unless Otherwise
Noted. k: kΩ, M: MΩ

CAPACITORS
Are in μF, Unless Otherwise
Noted. P: pF

TOLERANCE
J: ±5% G: ±2% F: ±1%

Each D.C. Voltage shows the nominal value in volts at no input signal.

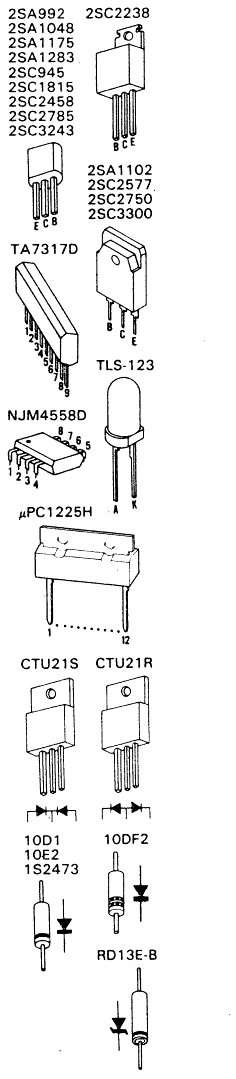
Electrolytic Capacitor:
Capacitnce[μF]/Volt[V]

SYMBOL OF FUNCTION
(k) POWER AMP
(ℓ) PROTECTOR
(m) POWER SUPPLY
(n) INDICATOR

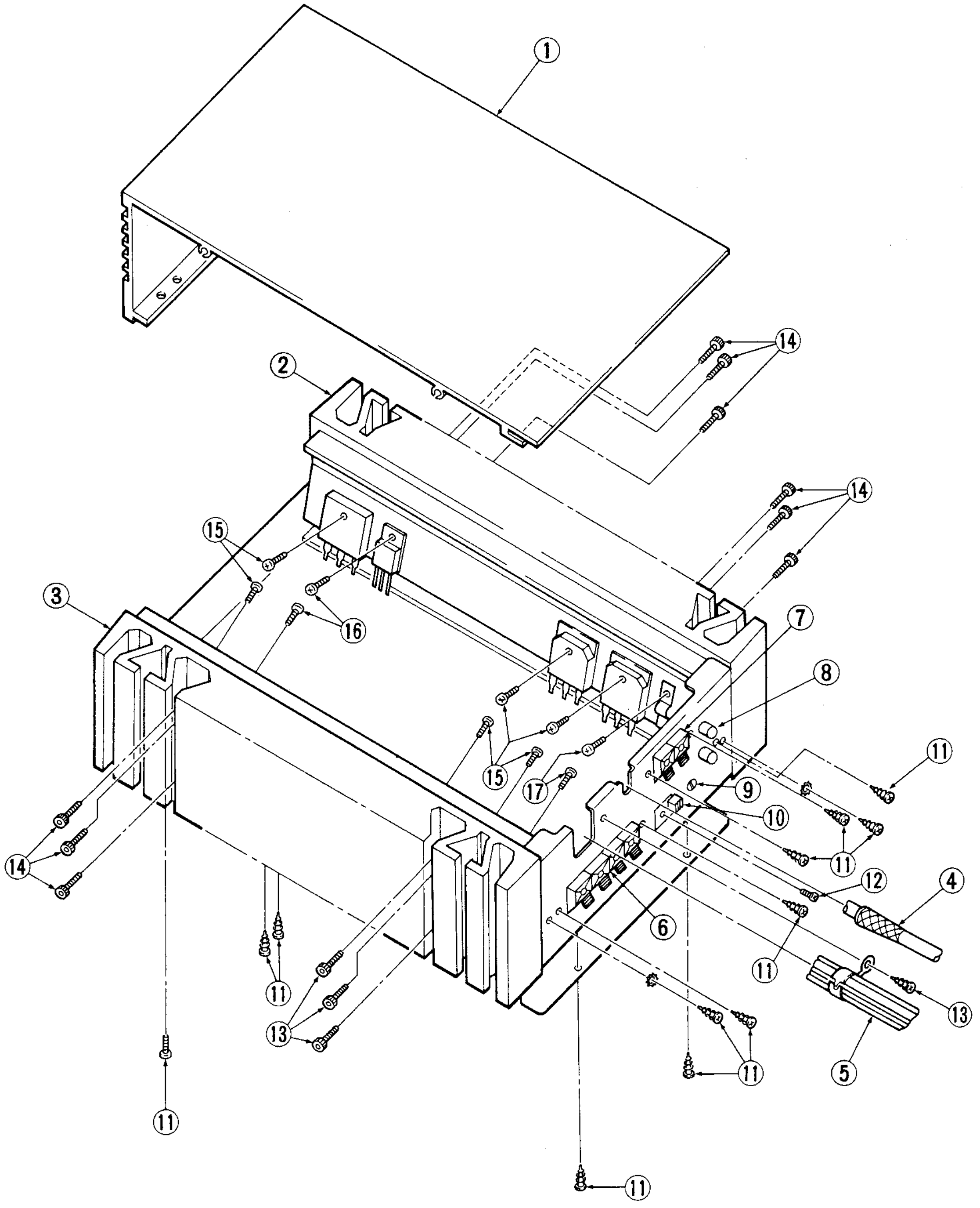
oS1a,b INPUT SELECTOR
1. LINE Hi
2. LINE Lo
3. BOOSTER Lo
4. BOOSTER Hi

oS2a,b BTL
1. 2ch
2. BTL

SYMBOL
△ Ceramic Capacitor
⊡ Non-Inflammable Resistor
◎(m) Mylar


2SA992
2SA1048
2SA1175
2SA1283
2SC945
2SC1815
2SC2458
2SC2785
2SC3243
2SC2238
2SA1102
2SC2577
2SC2750
2SC3300
TA7317D
TLS-123
NJM4558D
μPC1225H
CTU21S
CTU21R
10D1
10E2
1S2473
10DF2
RD13E-B

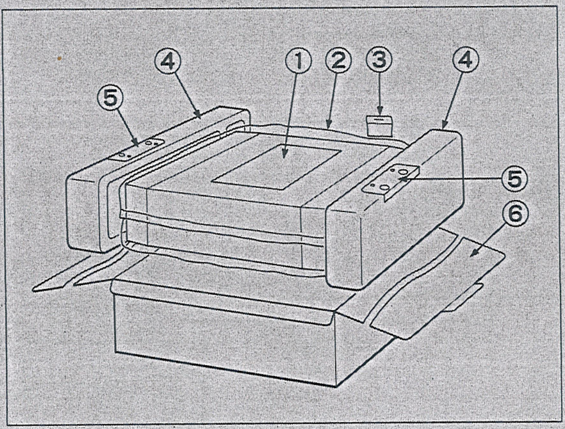
6. OTHER PARTS



Parts List

Parts No.	Stock No.	Description
1	47265800	Bonnet
2	47254000	Left Heat Sink
3	47229600	Right Heat Sink
4	46635900	DIN Socket Code Ass'y
5	46635800	Connection Code Ass'y with Fuse
5-1	46602400	Power Fuse 20A
5-2	07189000	Power Fuse 4A
6	46637400	4P Push Terminal, BOOSTER INPUT
7	46636100	2P Push Terminal, RADIO B. RETURN B
8	46438100	2P Input Terminal Board, LINE IN
9	46636300	Rotaly SW., INPUT SELECTOR
10	46177200	Slide SW., BTL
11	46267900	M3 x 8 Binding Head Deltite Screw
12	46399100	M2.6 x 4 Pan Head Taptite Screw
13	00461600	M3 x 6 Binding Head Deltite Screw
14	46535000	M3 x 12 Hex Socket Head Mashine Screw
15	00422000	M3 x 8 Binding Head Mashine Screw
16	00421900	M3 x 6 Binding Head Mashine Screw
17	46269000	M3 x 4 Binding Head Deltite Screw

7. PACKING LIST



Parts List

Parts No.	Stock No.	Description
1	46560400	Operating Instruction
2	47229100	Vinyl Bag
3	47230800	Mounting Screw Ass'y
4	47231600	Styrofoam Packing
5	47228800	Mounting Holder
6	47231500	Carton Case

Sansui

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